

Received: 07 January 2021 / Accepted: 20 April 2022 / Published online: 30 April 2022

DOI 10.34689/SH.2021.24.2.028

UDC 616.24-002-053.31

## A CASE OF FAVORABLE OUTCOME OF CONGENITAL PNEUMONIA IN A PREMATURE INFANT EXTREMELY LOW BODY WEIGHT

**Gulnar B. Taiorazova**<sup>1</sup>, <https://orcid.org/0000-0002-8450-9204>

**Aliya R. Alimbaeva**<sup>1</sup>, <https://orcid.org/0000-0002-5082-4636>

**Sayat Z. Tanatarov**<sup>1</sup>, <https://orcid.org/0000-0001-8958-8768>

**Zhanargul K. Smailova**<sup>1</sup>, <https://orcid.org/0000-0002-4513-4614>

**Yuri F. Lobanov**<sup>2</sup>, <https://orcid.org/0000-0001-6284-1604>

<sup>1</sup> NJSC Semey Medical University, Semey, Republic of Kazakhstan;

<sup>2</sup> Altai State Medical University, Barnaul, Russian Federation.

### Abstract

**Relevance:** Every year in the world about 15 million newborns are born prematurely, on average it is every tenth child. Currently, many countries are taking steps to reduce mortality among premature infants. For example, in the register of the University of Iowa USA, a boy born in a Tokyo maternity hospital with a record low weight – 268 g – this Japanese newborn is officially registered as an infant born with the smallest weight in the world, who managed to survive. The previous record belonged to a boy from Germany, who was born in 2009 – his weight was 274 grams. The world's smallest girl weighing 252 grams was also born in Germany. In the entire history of modern medicine, 23 cases have been registered when newborns weighing less than 300 g managed to survive, and 19 of them were girls, four were boys. The case we describe is unique in that a newborn weighing 470 grams with congenital pneumonia followed by a successful outcome. [24].

**Objective:** To present clinical manifestations of changes in laboratory parameters and possible outcomes of congenital pneumonia in premature newborns.

**Materials and methods:** retrospective analysis. This clinical case is described based on the medical history of a patient with extremely low body weight. The characteristic changes in clinical and laboratory parameters are described, in a girl with a diagnosis of Congenital pneumonia, severe severity. Respiratory distress syndrome, severe severity. The gestational age is 25 weeks and 5 days.

**Conclusion:** A premature newborn with an extremely low body weight (470 grams) was in a Perinatal center, where he received specialized assistance in treatment and nursing for 124 days. Despite the deep immaturity and prematurity, this case has a favorable outcome. The surviving premature newborn had the development of bronchopulmonary dysplasia (BPD), anemia, which in the future these conditions affect the quality of life of the child. In dynamics, the child was discharged home in satisfactory condition, with a weight of 2003. The registered postconceptual age is 41 weeks 6 days. In modern medicine, this unique case can be indicative in terms of further more detailed study of congenital pneumonia in premature infants with extremely low body weight and interest students of medical universities, practicing neonatologists – resuscitators. And for doctors of related specialties.

**Key words:** congenital pneumonia, premature newborn.

### Резюме

## СЛУЧАЙ БЛАГОПОЛУЧНОГО ИСХОДА ВРОЖДЕННОЙ ПНЕВМОНИИ У НЕДОНОШЕННОГО РЕБЕНКА С КРАЙНЕ НИЗКОЙ МАСОЙ ТЕЛА

**Гульнар Б. Тайоразова**<sup>1</sup>, <https://orcid.org/0000-0002-8450-9204>

**Алия Р. Алимбаева**<sup>1</sup>, <https://orcid.org/0000-0002-5082-4636>

**Саят З. Танатаров**<sup>1</sup>, <https://orcid.org/0000-0001-8958-8768>

**Жанаргуль К. Смаилова**<sup>1</sup>, <https://orcid.org/0000-0002-4513-4614>

**Юрий Ф. Лобанов**<sup>2</sup>, <https://orcid.org/0000-0001-6284-1604>

<sup>1</sup> НАО «Медицинский университет г. Семей», г. Семей, Республика Казахстан;

<sup>2</sup> Алтайский государственный медицинский университет, г. Барнаул, Российская Федерация.

**Актуальность:** Ежегодно в мире около 15 миллионов новорожденных рождаются недоношенными, в среднем это каждый десятый ребенок. В настоящее время, многие страны предпринимают шаги для снижения смертности среди недоношенных младенцев. К примеру в реестре Университета Айова США, Мальчик, родившийся в роддоме Токио с рекордно малым весом – 268 г, – этот японский новорожденный официально зарегистрирован как младенец, появившийся на свет с самым малым в мире весом, которому удалось выжить. Предыдущий рекорд принадлежал

мальчику из Германии, появившемуся на свет в 2009 году – его вес составлял 274 грамма. Самая маленькая в мире девочка весом 252 грамма также родилась в Германии. За всю историю современной медицины зарегистрировано 23 случая, когда новорожденным с весом менее 300 г удалось выжить, причем 19 из них – девочки, четверо – мальчики. Описываемый нами случай уникален тем, что новорожденный весом 470 грамм с врожденной пневмонией в последующем с благополучным исходом. [24].

**Цель:** Представить клинические проявления изменений лабораторных показателей и возможных исходов врожденной пневмонии у недоношенных новорожденных.

**Материалы и методы:** ретроспективный анализ. Данный клинический случай описан на основании истории болезни пациента с экстремально низкой массой тела. Описаны характерные изменения клинических и лабораторных показателей, у девочки с диагнозом: Врожденная пневмония, тяжелой степени тяжести. Респираторный дистресс синдром, тяжелой степени тяжести. Гестационный возраст 25 недель и 5 дней.

**Вывод:** Недоношенный новорожденный с экстремально низкой массой тела (470 грамм), находился в Перинатальном центре, где получал специализированную помощь в лечении и выживании в течении 124 дней. Несмотря на глубокую незрелость и недоношенность данный случай имеет благоприятный исход. У выжившего недоношенного новорожденного отмечалось развитие бронхолегочной дисплазии (БЛД), анемии, что в дальнейшем эти состояния влияют на качество жизни ребенка. В динамике, ребенок выписан домой в удовлетворительном состоянии, с весом 2003г. Скорректированный постконцептуальный возраст 41 неделя 6 дней. В современной медицине этот уникальный случай может быть показательным в плане дальнейшего более детального изучения врожденных пневмоний у недоношенных детей с экстремально низкой массой тела и заинтересовать обучающихся студентов медицинских вузов, практикующих врачей неонатологов – реаниматологов. И для врачей смежных специальностей.

**Ключевые слова:** врожденная пневмония, недоношенный новорожденный.

Түйіндеме

## **ТӨМЕН ДЕНЕ САЛМАҒЫМЕН ЖЕТІЛМЕЙ ТУЫЛҒАН НӘРЕСТЕДЕГІ ТУА БІТКЕН ПНЕВМОНИЯНЫҢ ҚОЛАЙЛЫ НӘТИЖЕЛІ ЖАҒДАЙЫ**

**Гульнар Б. Тайоразова<sup>1</sup>**, <https://orcid.org/0000-0002-8450-9204>

**Алия Р. Алимбаева<sup>1</sup>**, <https://orcid.org/0000-0002-5082-4636>

**Саят З. Танатаров<sup>1</sup>**, <https://orcid.org/0000-0001-8958-8768>

**Жанаргуль К. Смаилова<sup>1</sup>**, <https://orcid.org/0000-0002-4513-4614>

**Юрий Ф. Лобанов<sup>2</sup>**, <https://orcid.org/0000-0001-6284-1604>

<sup>1</sup> "Семей Медицина Университеті" АҚ, Семей қаласы, Қазақстан Республикасы;

<sup>2</sup> Алтай мемлекеттік медицина университеті, Барнаул қаласы, Ресей Федерациясы.

**Өзектілігі:** Жыл сайын әлемде шамамен 15 миллион жаңа туған нәресте шала туылады, орташа есеппен бұл әрбір оныншы бала. Қазіргі уақытта көптеген елдер шала туылған нәрестелер арасындағы өлімді азайту үшін шаралар қабылдауда. Мысалы, АҚШ – тың Айова университетінің тізілімінде Токио перзентханасында туылған, салмағы 268 г бала - бұл жапондық нәресте әлемдегі ең кішкентай салмақпен дүниеге келген бала ретінде ресми түрде тіркелді. Алдыңғы рекорд 2009 жылы туылған Германиядан туылған балаға тиесілі болатын – оның салмағы 274 грамм болды. Одан кейін салмағы 252 грамм болатын әлемдегі ең кішкентай қыз Германияда дүниеге келген еді. Қазіргі заманғы медицина тарихында бұндай 23 жағдай тіркелген, салмақтары 300 г-нан аз аман қалған нәрестелер, олардың он тоғызы қыздар, төртеуі ұлдар. Біз сипаттаған жағдай ерекше, себебі салмағы 470 грамм болатын нәресте туа біткен пневмониямен туылған және сәтті үйіне шығарылған. [24].

**Мақсаты:** Зертханалық көрсеткіштердің өзгеруінің клиникалық көріністерін және шала туылған нәрестелердегі туа біткен пневмонияның мүмкін нәтижелерін ұсыну.

**Материалдар мен әдістер:** Ретроспективті талдау. Бұл клиникалық жағдай дене салмағы өте төмен науқастың медициналық тарихы негізінде сипатталған. Клиникалық және зертханалық көрсеткіштердің тән өзгерістері сипатталған, диагнозы бар қызда: туа біткен пневмония, ауыр дәрежелі ауырлықта. Респираторлық стресс синдромы, ауыр ағымды. Гестациялық жасы 25 апта және 5 күн.

**Қорытынды:** Дене салмағы өте төмен (470 грамм) шала туылған нәресте Перинаталды орталықта болды, онда 124 күн ішінде емдеу мен күтім, мамандандырылған көмек алды. Терең жетілмегендігіне және ерте жетілуіне қарамастан, бұл жағдай қолайлы нәтиже береді. Тірі қалған шала туылған нәрестеде бронхопульмональды дисплазияның, анемияның дамуы байқалды, болашақта бұл жағдайлар баланың өмір сапасына әсер етеді. Динамикада бала қанағаттанарлық жағдайда, салмағы 2003г болып үйге шығарылды. Қазіргі медицинада бұл ерекше жағдай, дене салмағы өте төмен шала туылған нәрестелердегі туа біткен пневмонияны одан әрі егжей – тегжейлі зерттеу және медициналық университеттердің студенттері мен неонатолог-реаниматолог дәрігерлерінің қызығушылығын тудыруы мүмкін. Және аралас мамандық дәрігерлері үшін қажет.

**Түйінді сөздер:** Туа біткен пневмония, шала туылған нәресте.

**Bibliographic citation:**

Taiorazova G.B., Alimbaeva A.R., Tanatarov S.Z., Smailova Zh.K., Lobanov Yu.F. A case of favorable outcome of congenital pneumonia in a premature infant extremely low body weight // *Nauka i Zdravookhranenie* [Science & Healthcare]. 2022, (Vol.24) 2, pp. 225-232. doi 10.34689/SH.2022.24.2.028

Тайоразова Г.Б., Алимбаева А.Р., Танатаров С.З., Смаилова Ж.К., Лобанов Ю.Ф. Случай благополучного исхода врожденной пневмонии у недоношенного ребенка с крайне низкой массой тела // *Наука и Здравоохранение*. 2022. 2(Т.24). С. 225-232. doi 10.34689/SH.2022.24.2.028

Тайоразова Г.Б., Алимбаева А.Р., Танатаров С.З., Смаилова Ж.К., Лобанов Ю.Ф. Төмен дене салмағымен жетілмей туылған нәрестедегі туа біткен пневмонияның қолайлы нәтижелі жағдайы // *Ғылым және Денсаулық сақтау*. 2022. 2 (Т.24). Б. 225-232. doi 10.34689/SH.2022.24.2.028

**Relevance**

Neonatal pneumonia in premature newborns is an inflammatory and infectious process that occurs in utero or during passage through the birth canal of a newborn and sometimes carries specific and nonspecific manifestations in the first 72 hours of a child's life [12,23]. According to the World Health Organization (WHO), for the period of 2019, about 50% of all deaths in children in the first 5 years of life occurred in the neonatal period. In 33% of cases, mortality was in the first 24 hours of life, in 49.5%, mortality was in the first 7 days of life. The leading role in the factor of causes of death is occupied by premature birth, the course of complicated pregnancy, the outcome of childbirth with various pathologies: severe cardio-respiratory depression, infections and malformations. Pregnant women who received specialized assistance, consultations in accordance with world practices, the probability of death of a newborn is reduced by 16%, and cases of premature births are 24% [4,17]. In turn, the incidence of children born at full term, according to world indicators, is about 1%. The share of morbidity in premature newborns accounts for 10%. According to Rosstat for 2020, infant mortality from pneumonia reaches 7.5% [11,3].

Neonatal pneumonia is a formidable infectious and bacterial disease, after sepsis of newborns. Early pneumonia occurs in the first hours of life, and later than 7 days - pneumonia with a late onset. The development of a late onset is typical for newborns in the neonatal intensive care unit (NICU) who are on invasive respiratory therapy. Invasive manipulations always increase the incidence of infection. According to the etiological spectrum, the causative agents of pneumonia are various kinds of microorganisms, such as bacteria, viruses, fungi. Infection of newborns occurs during the process of childbirth when passing through the birth canal of the mother, as well as through contact with microorganisms in the NICU [23].

**Aim.** To present the clinical manifestations, changes in laboratory parameters and possible outcomes of congenital pneumonia in preterm infants.

**Materials and methods:** a retrospective analysis. This clinical case is described on the basis of the developmental history of a newborn with extremely low body weight. Characteristic changes in clinical and laboratory parameters are described in a girl with a diagnosis of Congenital pneumonia, severe. Respiratory distress syndrome, severe. Gestational age 25 weeks and 5 days.

**Description of the clinical case:**

Newborn baby, date and time of birth: 14.04.2021, time 10:15. She was born in the Perinatal Center (PC) in Semey.

**Anamnesis of life:**

The child from the 2nd pregnancy, has been in the dispensary for pregnancy since 9 weeks. I trimester - with no features. II trimester - from 21 to 27.03.2021 Inpatient treatment in the Central District Hospital of the Urdzhar region with a diagnosis of Pregnancy 23 weeks 1 day. The threat of premature birth. 04.11.2021 Inpatient treatment at the Ayaguz Central District Hospital with a diagnosis of Severe preeclampsia, Respiratory distress syndrome (RDS) fetal prophylaxis was started (full course).

**From the prenatal record:**

Ultrasound of the fetus dated 01.22.2021. Conclusion: Pregnancy 14 weeks. The threat of abortion. Consultation of a geneticist from 03.01.2021. Conclusion: Pregnancy 18-19 weeks. Hyperechoic focus in the left ventricle of the heart. Ultrasound of the fetus from 03.01.2021. Conclusion: Pregnancy 18 weeks 4 days according to fetometry of the fetus. Low placentation.

From the discharge list with epicrisis Central District Hospital of the Ayagoz district: Obstetric ultrasound (04.11.2021) Conclusion: Pregnancy 25 weeks 2 days.

Ultrasound of the kidneys (11.04.2021) Conclusion: Echo-signs of micronephrolithiasis. echoes of pyelonephritis.

Ultrasound of the abdominal cavity, small pelvis (04.11.2021) Conclusion: No free fluid was detected in the abdominal cavity and small pelvis.

Child from the 1st birth. Mother's diagnosis: Singleton preterm birth at 25 weeks 5 days of gestation in occipital presentation of the fetus. Severe preeclampsia. Intrauterine growth retardation of the fetus. Misperfusion III degree. Critical state of the fetus.

Anthropometric data of the newborn: Birth weight - 470.0 g, height - 32 cm, head circumference - 22 cm, chest circumference -20 cm. Apgar score 2/3 points. RDS prophylaxis from 04.11.2021-04.14.2021-full course antibiotic prophylaxis from 04.14.2021-full course.

The condition at birth is extremely severe due to severe respiratory failure, deep morphofunctional immaturity. Adopted in a warm diaper, plastic bag under radiant heat. [Level of Evidence - A] [10,22]. Breathing is absent.

There are no reflexes of congenital automatism, areflexia, atony are noted. The skin is clean, pale pink with a cyanotic tint, slight striation of the palms and feet. Visible mucous membranes are clean, pale. The subcutaneous fat layer is thinned. The head is rounded, large fontanelle 0.5\* 0.5 cm, not tense, the bones of the skull are supple. The chest is symmetrical. On auscultation, sharply weakened breathing is heard over the lungs, crepitant rales on both

sides. Saturation - 50%, heart rate -168. Resuscitation measures were carried out: Ventilation with the T-system was started with the parameters PIP-20 cm PEEP-5 cm, Fi O<sub>2</sub> -40%, monitoring. In dynamics, the child's condition does not stabilize, there is no chest excursion. Blood saturation remains within - 60%. Given the extremely severe respiratory failure, the child was intubated, endotracheal tube (ETT) -2.5 cm in depth - 6.5 cm, and ventilation with Ambu bag FiO<sub>2</sub> -50% was started. Against the background of sharply weakened breathing, a mass of crepitant rales. Conducted surfactant replacement therapy. Continued mechanical ventilation with an Ambu bag, the percentage of oxygen was reduced to 30%, after stabilization of the condition, the child was transferred to a transport incubator, connected to a transport apparatus with the parameters PIP-18 cm, PEEP-5 cm, Tvd-0.35, RR-57, FiO<sub>2</sub>-30 %, saturation -85%. Treatment performed: radiant heat regimen; ventilation with T-system with parameters PIP-20cm PEEP-5 cm, Fi O<sub>2</sub> -40% Tracheal intubation ETT -2.5 cm to a depth of -6.5. Artificial respiration (AR) with Ambu bag Fi O<sub>2</sub> -50% surfactant replacement therapy. Transport box.

The condition of the child during the transfer is extremely difficult due to prematurity, respiratory failure. The skin integuments acquired a pale pink color, small striation of the palms and feet. Muscle tone is sharply reduced, the position of the "frog". Reflexes of innate automatism are not called. The head is rounded, the bones of the skull are supple, large fontanelle 0.5 x 0.5 cm is not tense. The chest is shortened, retraction of the intercostal spaces. On auscultation, sharply weakened breathing is heard over the lungs, crepitant rales on both sides of the lungs. Heart sounds are loud, rhythmic. Heart rate-170 beats / min. Saturation - 82%. The abdomen is soft. The liver and spleen are not enlarged. There was no chair. There was no urination. The genital organs are developed according to the female type, the large labia does not cover the small ones. The umbilical residue is moist, closer to the womb. For further observation, examination and treatment, without interrupting the heat chain, in a transport incubator on a ventilator, PIP-18 cm, PEEP-5 cm, T-0.35, RR-57, FiO<sub>2</sub>- 30%, Saturation -88% the child is transferred in the Neonatal Intensive Care Unit (NICU). Diagnosis during translation: Main: Respiratory distress syndrome, severe severity. Background: Gestational age 25 weeks 5 days. Extremely low birth weight.

Complaints upon admission to the NICU: respiratory failure, extremely low body weight, extreme immaturity of organs and systems, prematurity.

**Objective data:** The general condition of the child is extremely severe due to respiratory failure, extreme immaturity of organs and systems, prematurity, extremely low body weight.

Continued: Artificial respiration (AR) in CMV mode with parameters Tvd - 0.30, RR -60, PEEP-5 cm, PIP - 17 cm, MAP-10 cm oxygen 30%, saturation within 92-95%. According to RDS protocol. Congenital pneumonia protocol [9,7]. The skin is pink, small striation of the palms and feet. Muscle tone is sharply reduced, the position of the "frog". Reflexes of innate automatism are not called. The head is rounded, the bones of the skull are malleable, the large fontanelle is 0.5 x 0.5 cm, not tense. The chest is

shortened, retraction of the intercostal spaces. Auscultatory over the lungs sharply hardware breathing is heard, crepitant wheezing on both sides of the lungs. Heart sounds are loud, rhythmic. Heart rate-170 beats / min. The abdomen is soft. The liver and spleen are not enlarged. Installed gastric tube, tube mucous discharge. There was no chair. There was no urination. The genital organs are developed according to the female type, the large labia does not cover the small ones. The umbilical residue is moist, closer to the womb.

#### **Substantiation of the clinical diagnosis:**

Complaints: respiratory failure, extremely low body weight, extreme immaturity of organs and systems, prematurity

#### **Objective data:**

The general condition of the child is extremely severe due to respiratory failure, extreme immaturity of organs and systems, prematurity, extremely low body weight. Artificial respiration (AR) was continued in the CMV mode with parameters Tvd -0.30, RR -60, PEEP-5 cm, PIP - 17 cm, MAP-10 cm oxygen 30%, saturation within 92-95%. The skin is pink, small striation of the palms, feet. A child of the right physique, low nutrition. Weight deficit on the Lyubchenko scale more than 10 percentile. Muscle tone is sharply reduced, the position of the "frog". Reflexes of innate automatism are depressed. The head is rounded, the bones of the skull are supple, large fontanelle 0.5 x 0.5 cm is not tense. The chest is shortened, the excursion is sufficient. Auscultatory over the lungs is auscultated hardware breathing, crepitant wheezing on both sides of the lungs. Heart sounds are loud, rhythmic. Heart rate-170 beats / min. The abdomen is soft. The liver and spleen are not enlarged. There was no chair. There was no urination. The external genital organs are developed according to the female type, the large labia do not cover the small ones. The umbilical residue is moist, closer to the womb.

#### **Laboratory and diagnostic studies:**

04.14.2021 15:43. Blood gases and electrolytes with additional tests (lactate, glucose, carboxyhemoglobin) on the cBase (Ecf) analyzer, c- 4.2; cCa<sup>2+</sup> - 0.73; cCl<sup>-</sup> - 112.0 (112); cHCO<sub>3</sub> (P,st),s - 20.30 (20.3); cK<sup>+</sup> - 7.3; cNa<sup>+</sup> - 135.0 (135); ctBil- 0.00 (0); ctO<sub>2</sub>,s - 26.90 (26,9); FHHb - 4.7; FMetHb - 2.4; FO<sub>2</sub>Hb - 88.60 (88.6); FCOHb - 4.30 (4.3); p50, s - 16.19; pCO<sub>2</sub>(T) - 42.70 (42.7); pH(T) - 7.311; pO<sub>2</sub>(T) - 50.70 (50.7); sO<sub>2</sub> - 95.00 (95); blood pH - 7.309; pO<sub>2</sub> - 51.50 (51.5); cGlu - 3.30 (3.3); cLac - 3.30 (3.3); ctHb - 217.00 (217); pCO<sub>2</sub> - 43.10 mm Hg (kPa) (43.1);

14.04.2021 20:44 C reactive protein (CRP) semi-quantitative/qualitative CRP qualitative - Absent; CRP - 0 mg / l

14.04.2021 20:47 Detailed blood test (Dbt) (6 parameters) on the analyzer color index - 1.00 (1); hematocrit (HCT) in the blood - 61%; relative (%) number of monocytes (MON%) in the blood - 6.0% (6); relative (%) number of eosinophils (EO%) in the blood - 0.0% (0); percentage (%) of basophils (BA%) in the blood - 0.0% (0); percentage (%) number of lymphocytes (LYM%) in the blood - 36.0% (36); percentage (%) number of neutrophils (NEUT%) in the blood - 54.0% (54); absolute number of neutrophils (NEUT #) in the blood - 4.0 / l (4); leukocytes in the blood - 7.9 / l; platelets (PLT) in the blood - 186.0 / l (186); erythrocytes (RBC) in the

blood - 6.0 / l (6); hemoglobin (HGB) in the blood - 203 g / l; ESR (analyzer) - 0 mm/h;

15.04.2021 11:56 Dbt (6 parameters) on the analyzer color index - 1.00 (1); hematocrit (HCT) in the blood - 59%; relative (%) number of monocytes (MON%) in the blood - 7.0% (7) ; relative (%) number of eosinophils (EO%) in the blood - 0.0% (0); percentage (%) of basophils (BA%) in the blood - 0.0% (0); percentage (%) number of lymphocytes (LYM%) in the blood - 36.0% (36); percentage (%) number of neutrophils (NEUT%) in the blood - 53.0% (53); absolute number of neutrophils (NEUT#) in the blood - 4.0 / l (4); leukocytes in the blood - 7.5 / l; platelets (PLT) in the blood - 237.0 / l (237); erythrocytes (RBC) in the blood - 5.8 / l; hemoglobin (HGB) in the blood - 189 g / l; ESR (analyzer) - 0 mm/h;

15.04.2021 11:58 CRP semi-quantitative/qualitative CRP qualitative - Absent; CRP - 0 mg / l 15.04.2021 12:14 Rh factor determination Rh factor - Rh + (positive); Rh factor - Rh + (positive);

19.04.2021 11:24 bacteriological sowing result - microflora growth was not detected;

**Instrumental research:**

Plain chest x-ray (1 projection) (14.04.2021 12:00) Conclusion: Pneumonia.

Echocardiography (16.04.2021 13:27) Conclusion: The cavities of the heart are not dilated. The valves are not changed. Minimal regurgitation on the tricuspid valve (TV). The contractility of the myocardium of the left ventricle is satisfactory.

Based on the foregoing, the clinical

Primary: Congenital pneumonia, severe severity, acute course.

Competing: severe RDS.

Concomitant: Low weight for gestational age.

Background: Extremely low mass at birth. Gestational age 25 weeks and 5 days.

02.06.2021 11:00 The child was transferred to the Department of Pathology of Newborns and Nursing of Premature Babies (DPNandNPB)

The child was in the NICU for 63 days, the diagnosis during transfer to the acute renal failure and nursing premature babies:

Primary: Bronchopulmonary dysplasia, new form, severe

Competing: Congenital pneumonia, severe, acute course

Background: RDS, respiratory disorders, severe

Background: Extremely low birth weight. Extreme immaturity. Gestational age 25 weeks and 5 days.

Adjusted gestational age 33 weeks.

The child was nursed for 61 days in the department of DPN and NPB, the final diagnosis of the child:

Primary: Bronchopulmonary dysplasia, new form, severe, in remission.

Competing: Retinopathy of prematurity stage 1, zone 1 active phase in both eyes. H35.2 Concomitant 1: Congenital pneumonia, severe, acute course, recovery.

Concomitant 2: RDS, respiratory disorders, severe severity, relief.

Companion 3: Anemia of Prematurity

Concomitant 4: Hypoxic-ischemic lesion of the central nervous system, cerebral ischemia of the II degree,

depression syndrome, periventricular hemorrhage of the I degree, acute period, improvement.

Background: Extremely low mass at birth. Extreme immaturity. Gestational age 25 weeks and 5 days.

Adjusted post-conceptual age 41 weeks 6 days.

**During the stay of the child in the hospital received the following treatment:**

1. Mode: incubator, radiant heat, ambulant regimen
2. Surfactant replacement therapy
3. Artificial respiration (AR)
4. Secondary ventilation(SV)
5. Parenteral nutrition
6. Hemostatic therapy
7. Stimulation of the respiratory center
8. Antibacterial therapy
9. fungicide therapy
10. Hormone therapy (systemic glucocorticosteroids)
11. Inhalation therapy (Broncholytics)
12. Diuretics
13. Antianemic therapy
12. Neonatal care

09.08.2021 10:24 Status on the day of discharge from the Semy Perinatal Center:

Weight - 2473.0 grams, weight gain during the period of stay in the Perinatal Center was: 2003.

The child's condition is satisfactory.

Mom has no complaints. Regime ward, together with my mother. Sucks well, digests, does not burp, gains weight. The skin is clean and visible mucous membranes are clean, pale pink. B/R is not tense. Motor activity, muscle tone are sufficient, flexion posture. RVA are called. The chest is symmetrical. Puerile breathing over the lungs on auscultation, no wheezing. Heart sounds are clear, rhythmic. The abdomen is soft on palpation, painless in all departments. The liver and spleen are not enlarged. The umbilical wound is epithelized. Stool yellow, regular. Urination is free. The child is discharged home with his mother, recommendations for caring for the newborn are given.

**Discussion of the results of the study**

This case of congenital pneumonia in a preterm infant is somewhat unique in neonatal practice. An extremely low birth weight newborn who weighed 470 grams at birth. On the recommendation of WHO, Kazakhstan switched from January 1, 2008 to a new criterion of live births. According to this decree, nursing children from 500 grams. [13]. In this case, the leading factors of preterm birth were: severe preeclampsia, low placentation, infection of the genitourinary system of the mother, the threat of abortion, intrauterine growth retardation (IUGR) of the fetus, impaired blood flow of the III degree, the critical state of the fetus. Maternal infections (pyelonephritis), aggravated obstetric anamnesis led to congenital infection of the fetus. Deep immaturity of the newborn and prematurity were the phenotype for this development of the pathological process. According to the author Volodin N.N., about 1% of children with a gestational age of 37 weeks suffer from congenital pneumonia, while this pathology in premature babies occurs

in 10% of cases. Mortality in congenital pneumonia is 5-10% [2].

Zubkov V.V., Chernyakhovsky O.B., Suvorova M.P., Yakovlev S.V. and others, say that congenital pneumonia in newborns with extremely low body weight, a surviving child, can cause severe complications, such as: retinopathy of prematurity, bronchopulmonary dysplasia, and anemia of prematurity, etc., that in the future these conditions affect the quality child's life. The presented clinical case corresponds to the literature data, both the course of the pathological process and the occurrence of complications in this surviving newborn weighing 470 grams. The microbial landscape of pathogens is diverse; they can also be: Klebsiella, group B streptococci, chlamydia, herpes infection, cytomegalovirus infection, group B streptococci, E. coli and mycoplasma [5,14,13,6,18].

Congenital pneumonia in premature newborns is often fatal. Treatment of such cases is extremely difficult, the prognosis is unfavorable. [6,19,21]. Mortality from congenital pneumonia in full-term newborns was 1.66%, premature babies born with a body weight of 1000 g or more - 2.3%, children, among other things, the adverse course of the disease is influenced by intrauterine malformations formed as a result of intrauterine infection CMVI in the II-III semester [1;15;20]. In this clinical case with a favorable outcome, the key to successful nursing of a premature newborn was: the use of a complex of modern perinatal technologies that have proven their effectiveness, which are adapted to the local conditions of the PC.

Shah P.S., Lui K. in their studies indicate the heterogeneity of methods used in different countries (and perinatal centers in different countries), leading, in general, to similar results, but, nevertheless, differing in details [22].

#### Conclusion

In this clinical case, the child was in the Semey Perinatal Center, received treatment and care for 124 days, despite the extremely low weight of the fetus (470 grams). In most cases, in surviving premature babies who have had congenital pneumonia, the formation of bronchopulmonary dysplasia is inevitable, with a subsequent favorable outcome. Thus, it is very relevant to analyze, evaluate the effectiveness and safety of perinatal technologies, modern methods, which in turn positively affect the outcome of treatment and the outcome of diseases around which the most heated discussions are being held. It is also important to develop an integral technological chain for nursing premature babies: from stabilizing their condition in the delivery room to feeding and timely correct diagnosis of infectious complications during treatment in the NICU.

**Contribution of the authors:** All authors equally participated in the study of the clinical case, analysis and writing of the article.

**Conflict of interest:** No conflict of interest has been declared.

**Financing.** When carrying out this work, there was no funding from third-party organizations and medical representative offices.

The work was done on an initiative basis.

**Publication details:** The results of this case have not been published previously in other journals and are not under consideration by other publishers.

#### Литература:

1. Антонов А.Г., Буркова А.С., Ионов О.В., Киртбая А.Р., Балашова Е.Н., Ленюшкина А.А., Крючко

Д.С., Никитина И.В., Рындин А.Ю., Козлова М.Д., Скворцова М.Д. Избранные клинические рекомендации по неонатологии. Под ред. Байбаринной Е.Н., Дегтярева Д.Н. М.: «ГЭОТАР-Медиа». 2016, 240с.

2. Володин Н.Н. Неонатология — национальное руководство / под ред. академика РАМН проф. М.: ГЭОТАР-Медиа, 2008. 749 с.

3. Волянюк Е.В., Сафина А.И. Врожденная пневмония у недоношенных: особенности этиологии, диагностики и лечения // Практическая медицина. 2011. №5 (53). С.55- 59.

4. Врожденная пневмония, заболеваемость и смертность новорожденных в мире. Всемирная организация здравоохранения <https://www.who.int/ru/news-room/factsheets/detail/newborns-reducing-mortality> (Дата обращения: 25.01.2022)

5. Зубков В.В., Рюмина И.И., Савельевой Г.М., Сухих Г.Т., Серова В.Н., Радзинского В.Е. Акушерство. Национальное руководство. Заболевания плода и новорожденного. Глава 59. Врожденные и перинатальные инфекции. Под редакцией. 2-е издание переработанное и дополненное / Москва: Геотар-Медиа, 2015. Раздел 5.

6. Ионов О.В., Никитина И.В., Зубков В.В., Митрохин С.Д., Крохина К.Н., Киртбая А.Р., Балашова Е.Н., Левадная А.В., Любасовская Л.А., Рюмина И.И., Дегтярев Д.Н., Крючко Д.С. Порядок обследования новорожденных с подозрением на инфекционную патологию и правила назначения антибактериальной терапии, принятые в отделении реанимации и интенсивной терапии новорожденных // Неонатология. 2014. №1. С. 95-106

7. Клинический протокол диагностики и лечения врожденная пневмония. Министерство здравоохранения Республики Казахстан протокол № 10 от 4.07.2014 года [http://www.rcrz.kz/docs/clinic\\_protocol/2014](http://www.rcrz.kz/docs/clinic_protocol/2014) (Дата обращения: 25.01.2022)

8. Клинический протокол № 10 Министерства здравоохранения и социального развития Республики Казахстан от 30.09. 2015 года «Медицинской реабилитации реанимация недоношенных детей» <https://www.krasotaimedicina.ru/diseases/children/neonatal-pneumonia> (Дата обращения 25.01.2022).

9. Клинический протокол диагностики и лечения респираторный дистресс синдром (РДС). Министерство здравоохранения и социального развития Республики Казахстан от 09.06.2016 года Протокол №4 [http://www.rcrz.kz/docs/clinic\\_protocol/2016](http://www.rcrz.kz/docs/clinic_protocol/2016). (Дата обращения 25.01.2022)

10. Международные критерии живорождения, рекомендованные ВОЗ, будут внедрены в Казахстане с 1 января 2008 года – Министерство здравоохранения РК. Kazakhstan Today. [https://www.kt.kz/rus/society/mezhdunarodnie\\_kriterii\\_zhivo-rozhdhenija\\_rekomendovannie\\_voz\\_budut\\_vnedreni\\_v\\_kazakhstan\\_s\\_1\\_janvarja\\_2008\\_goda\\_minzdrav\\_1153424272.html](https://www.kt.kz/rus/society/mezhdunarodnie_kriterii_zhivo-rozhdhenija_rekomendovannie_voz_budut_vnedreni_v_kazakhstan_s_1_janvarja_2008_goda_minzdrav_1153424272.html) (Дата обращения: 26.01.2022)

11. Пневмония новорожденных от 1 октября 2020 г. Krasota i Medicina.ru, 2022, <https://www.krasotaimedicina.ru/diseases/children/neonatal-pneumonia> (Дата обращения 25.01.2022).

12. Рооз Р., Генцель-Боровичени О., Прокитте Г. Неонатология. Практические рекомендации. М.; 2011. С.249–307.

13. Суворова М.П., Яковлев С.В., Дворецкий Л.И. Проблемы диагностики и антибактериальной терапии госпитальной пневмонии // Антибиотики и химиотерапия. 2001. Т. 46. № 9. С. 40-44.

14. Черняховский О.Б., Абрамова И.В., Полянчикова О.Л. Внутриутробные инфекции у новорожденных, факторы риска // Российский вестник перинатологии и педиатрии. 2009. № 1. С. 80-88.

15. Шухов В.С., Байбарина Е.Н., Рюмина И.И., Зубков В.В. Антимикробная терапия у детей. Практическое руководство. М.:ГЭОТАР Медиа, 2016. 320 с.

16. Brenda L. Tesini, University of Rochester School of Medicine and Dentistry, 2020. <https://www.msmanuals.com/ru> (Data obrashcheniya: 25.01.2022)

17. Donoghue V., Radiological Imaging of the Neonatal Chest. 2nd Revised Edition. (Ed.). Springer. 2008. 362 p.

18. Duke T. Neonatal pneumonia in developing countries. Arch Dis Child Fetal Neonatal Ed. 2005. V. 5. P. 90-94.

19. Hedlund G.L., Griscom N.T., Cleveland R.H., Kirks D.R. Respiratory system. In: Kirks DR, Griscom NT, editors. Practical pediatric imaging: diagnostic radiology of infants and children. 3rd ed. Philadelphia: Lippincott-Raven, 1998. 715. 7.

20. Jonathan Wyllie, Jos Bruinenberg, Charles Christoph Roehr, Mario Rüdiger Daniele Trevisanuto, Berndt Urlsberger European Resuscitation Council Guidelines for Resuscitation 2015 Section 7. Resuscitation and support of transition of babies at birth. Resuscitation. 2015. 95. 249–263.

21. Romero R., Hassan S.S. The vaginal microbiota of pregnant women who subsequently have spontaneous preterm labor and delivery and those with a normal delivery at term // Microbiome. 2014. N.2. pp.18.

22. Shah P.S., Lui K., Sjörs G., Mirea L., Reichman B., Adams M. International Network for Evaluating Outcomes (iNeo) of Neonates. Neonatal Outcomes of Very Low Birth Weight and Very Preterm Neonates: An International Comparison // J Pediatr. 2016. Vol. 177. P. 144-152.

23. Tesini B.L. University of Rochester School of Medicine and Dentistry, <https://www.msmanuals.com/ru> (Дата обращения: 26.01.2022)

24. V Yaponii vyzhil novorozhdenного vesom 268 grammov. <https://medvestnik.ru/content/news/V-Yaponii-vyhodili-novorozhdenного-vesom-268-grammov.html> (Acceced: 01.04.2022).

#### References:

1. Antonov A.G., Burkova A.S., Ionov O.V., Kirtbaya A.R. Balashova E.N., Lenyushkina A.A., Kryuchko D.S., Nikitina I.V., Ryndin A.Yu., Kozlova M.D., Skvortsova M.D. Izbrannye klinicheskie rekomendatsii po neonatologii [Selected clinical recommendations for neonatology]. Pod red. Baibarinoi E.N., Degtyareva D.N. M.: «GEOTAR-Media» 2016, pp. 240. [in Russian]

2. Volodin N.N. Neonatologiya - Natsional'noe rukovodstvo [Neonatology - National Guidelines]. Pod red. akademika RAMN prof. M.: GEOTAR-Media, 2008. pp.749. [in Russian]

3. Volyanyuk E.V., Safina A.I. Vrozhdenная pnevmoniya u nedonoshennykh: osobennosti etiologii, diagnostiki i lecheniya [Congenital pneumonia in premature infants: features of etiology, diagnosis and treatment]. Prakticheskaya meditsina [Practical medicine]. 2011. №5 (53). pp.55-59. [in Russian]

4. Vrozhdenная pnevmoniya, zaboлеваemost' i smertnost' novorozhdennykh v mire [Congenital pneumonia, morbidity and mortality of newborns in the world] Vsemirnaya organizatsiya zdavookhraneniya [World Health Organization] <https://www.who.int/ru/news-room/factsheets/detail/newborns-reducing-mortality> (Acceced: 25.01.2022) [in Russian]

5. Zubkov V.V., Ryumina I.I., Savel'evoi G.M., Sukhikh G.T., Serova V.N., Radzinskogo V.E. Akusherstvo. Natsional'noe rukovodstvo. Razdel 5. Zabolevaniya ploda i novorozhdenного. Glava 59. Vrozhdenные i perinatal'nye infektsii [Diseases of the fetus and newborn. Chapter 59. Congenital and perinatal infections]. Pod redaktsiei. 2-e izdanie pererabotannoe i dopolnennoe/ Moskva:Geotar-Media, 2015. [in Russian]

6. Ionov O.V., Nikitina I.V., Zubkov V.V., Mitrokhin S.D., Krokhhina K.N., Kirtbaya A.R., Balashova E.N., Levadnaya A.V., Lyubasovskaya L.A., Ryumina I.I., Degtyarev D.N., Kryuchko D.S. Poryadok obsledovaniya novorozhdennykh s podozreniem na infektsionnyu patologiyu i pravila naznacheniya antibakterial'noi terapii, priyatye v otdelenii reanimatsii i intensivnoi terapii novorozhdennykh FGBU [The procedure for examining newborns with suspected infectious pathology and the rules for prescribing antibacterial therapy adopted in the Neonatal Intensive Care Unit of the FSBI]. Neonatologiya [Neonatology] №1, 2014, pp. 95-106 [in Russian]

7. Klinicheskii protokol diagnostiki i lecheniya vrozhdenная pnevmoniya Ministerstva zdavookhraneniya Respubliki Kazakhstan protokol № 10 ot «4» iyulya 2014 goda [Clinical Protocol for diagnosis and treatment of congenital pneumonia. Ministry of Health of the Republic of Kazakhstan Protocol No. 10 dated July 4, 2014] [http://www.rcrz.kz/docs/clinic\\_protocol/2014](http://www.rcrz.kz/docs/clinic_protocol/2014) (Acceced:25.01.2022) [in Russian]

8. Klinicheskii protokol № 10 Ministerstva zdavookhraneniya i sotsial'nogo razvitiya Respubliki Kazakhstan ot «30» sentyabrya 2015 goda «meditsinskoj reabilitatsii reanimatsiya nedonoshennykh detei» [Clinical Protocol No. 10 of the Ministry of Health and Social Development of the Republic of Kazakhstan dated September 30, 2015 "Medical rehabilitation resuscitation of premature babies"] <https://www.krasotaimedicina.ru/diseases/children/neonatal-pneumonia> (Acceced: 25.01.2022). [in Russian]

9. Klinicheskii protokol diagnostiki i lecheniya respiratornyi distress sindrom (RDS) Ministerstva zdavookhraneniya i sotsial'nogo razvitiya Respubliki Kazakhstan ot «9» iyunya 2016 goda Protokol № 4 [Clinical Protocol for the diagnosis and treatment of Respiratory Distress syndrome (RDS) Ministry of Health and Social Development of the Republic of Kazakhstan dated June 9,

2016 Protocol No. 4]  
[http://www.rcrz.kz/docs/clinic\\_protocol/2016](http://www.rcrz.kz/docs/clinic_protocol/2016). (Acceced: 25.01.2022) [in Russian]

10. Mezhdunarodnye kriterii zhivorozhdeniya, rekomendovannye VOZ, budut vnedreny v Kazakhstane s 1 yanvarya 2008 goda. [The international criteria of live birth recommended by WHO will be implemented in Kazakhstan from January 1, 2008] Ministerstvo Zdravookhraneniya Respubliki Kazakhstan. Kazakhstan Today. [https://www.kt.kz/rus/society/mezhdunarodnie\\_kriterii\\_zhivo\\_rozhdenija\\_rekomendovannie\\_voz\\_budut\\_vnedreni\\_v\\_kazakhstan\\_s\\_1\\_janvarja\\_2008\\_goda\\_minzdrav\\_1153424272.html](https://www.kt.kz/rus/society/mezhdunarodnie_kriterii_zhivo_rozhdenija_rekomendovannie_voz_budut_vnedreni_v_kazakhstan_s_1_janvarja_2008_goda_minzdrav_1153424272.html) (Acceced: 26.01.2022) [in Russian]

11. Pnevmoniya novorozhdennykh [Pneumonia of newborns] ot 01.10.2020 g. *Krasota i Medicina.ru*. 2022. Informatsiya, opublikovannaya na saite: <https://www.krasotaimedicina.ru/diseases/children/neonatal-pneumonia> (Acceced: 25.01.2022). [in Russian]

12. Roosz R., Gentsel'-Borovicheni O., Prokittle G. Neonatologiya. *Prakticheskie rekomendatsii*. [Neonatology. Practical recommendations] M. 2011. pp.249–307. [in Russian]

13. Suvorova M.P., Yakovlev S.V., Dvoretiskii L.I. Problemy diagnostiki i antibakterial'noi terapii gospital'noi pnevmonii. [Problems of diagnosis and antibacterial therapy of hospital pneumonia]. *Antibiotiki i khimioterapiya* [Antibiotics and chemotherapy]. 2001. T.46. №9. pp. 40-44. [in Russian]

14. Chernyakhovskii O.B., Abramova I.V., Polyanchikova O.L. Vnutritrobnnye infektsii u novorozhdennykh, faktory riska [Intrauterine infections in newborns, risk factors]. *Rossiiskii vestnik perinatologii i pediatrii* [Russian Bulletin of Perinatology and Pediatrics]. 2009. № 1. pp. 80-88. [in Russian]

15. Shukhov V.S., Baibarina E.N., Ryumina I.I., Zubkov V.V. *Antimikrobnaya terapiya u detei* [Antimicrobial therapy in children]. Prakticheskoe rukovodstvo. M.: Geotar Media, 2016. pp.320 [in Russian]

16. V Yaponii vykhodili novorozhdennogo vesom 268 grammov [In Japan, a newborn weighing 268 grams survived] <https://medvestnik.ru/content/news/V-Yaponii-vykhodili-novorozhdennogo-vesom-268-grammov.html> (Acceced: 25.01.2022). [in Russian]

#### Contact information:

**Gulnara Bolatovna Tayorazova** - a 2-year doctoral student in the specialty "Medicine", Department of Pediatrics and Medical Rehabilitation named after D.M.Tusupova, NJSC "Semey Medical University".

**Post address:** Republic of Kazakhstan, 071400, Semey, Abaya st. 103.

**E-mail:** [gulnar-taiorazov@mail.ru](mailto:gulnar-taiorazov@mail.ru)

**Phone:** 8-775-551-20-40